REMARKS

This amendment is responsive to the Office Action dated June 5, 2003. Applicant has amended claims 3, 5, 14 and 17. Claims 1-34 are pending. A version of the amended claims showing changes pursuant to 37 CFR § 1.121(c)(ii) is attached. In the attached version of the amended claims, Applicant has used underlines to indicate inserted matter and strikeouts to indicate deleted matter.

Applicant has amended claims 3, 5, 14 and 17 to replace "proximal" with the more conventional variant of the word, "proximate."

Claim Rejections Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1-34 under 35 U.S.C. § 103(a) as being unpatentable over Yen et al. (US 5,992,962) in view of Serra (US 6,067,405) and Arce et al. (US 6,493,112 B1). According to the Examiner, Yen discloses print masks for inkjet printers, the print masks having triangular patterns formed by open dots and solid black dots, the open dots corresponding to the nozzles being turned off and the solid black dots corresponding to the printed nozzles, such that a multipass staggered swath printing is performed. The Examiner acknowledged that Yen does not disclose that the open dots and the solid black dots constitute logical values. The Examiner further acknowledged that Yen does not disclose the print mask being used in a laser printer. According to the examiner, Yen does indicate that the print masks can be implemented as a hardware or software driver to drive the print head.

According to the Examiner, it is well-known in the art that such software-driven print masks include a matrix set of logical values representing a pixel grid, as evidenced by Serra. The Examiner also said that Arce discloses a method and apparatus for producing halftone images using green-noise masks, wherein the mask is constituted by sets of binary values, and can be used in any specific printers, such as a laser printer or inkjet printer.

The Examiner concluded that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to implement the print masks of Yen to have binary values, as disclosed in Serra and Arce. The motivation for doing so, according to the Examiner, would have been to provide the print mask as a software driver for driving the print head such that the print mask can be used in a variety of printing engine types.

Yen further teaches the print mask extending in a first direction, the Examiner continued, wherein the first set of first solid black dots is spatially proximal [i.e., proximate] to the second set of solid black dots in the first direction, the spatial frequency of the first set of the solid black dots spatially clustered in the first triangle-like shape and the second set of the solid black dots spatially clustered in the second triangle-like shape being greater than the spatial frequency of neighboring halftone pixels. The Examiner further asserted that Yen discloses the mask extending in the first and second directions, wherein the first and second triangle-like shapes include a base and a peak, the base being oriented in the first direction and the base of the first triangle-like shape being spatially proximal [i.e., proximate] to the peak of the second triangle-like shape the second direction, the peaks being unaligned in the second direction. The Examiner further asserted that Yen discloses the set of open dots being spatially clustered in a third triangle-like shape, wherein the first and second triangle-like shapes have a first orientation and the third triangle-like shape having an orientation that is inverted relative to the first orientation, the boundary between the set of the open dots and the first and second sets of solid black dots being an irregular zigzag. The Examiner further declared that Yen discloses the mask being stored in a computer-readable data file.

According to the Examiner, Yen also discloses the inkjet printer having a varied breadth of swath as a function of image data and the mask during printing, i.e., the printed dots as a function of the mask form triangular-shaped patterns bordering with triangular-shaped patterns of the non-printed dots such that the printed swath has a varying breadth.

Applicant traverses the rejections.

In connection with combining references to support an assertion of obviousness, it is well established that the Examiner bears the burden of establishing a prima facie case of obviousness. In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). In doing so, the Examiner must determine whether the prior art provides a "teaching or suggestion to one of ordinary skill in the art to make the changes that would produce" the claimed invention. In re Chu, 36 USPQ2d 1089, 1094 (Fed. Cir. 1995). A prima facie case of obviousness is established only when this burden is met.

In the case of In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002), the Federal Circuit stated: "This factual question of motivation is material to patentability, and [can] not be resolved on subjective belief and unknown authority." Id. at 1434.

The Court of Appeals for the Federal Circuit has made clear that motivation to combine references must be found in the record, and that it is impermissible hindsight for the Examiner to use the motivation stated in Applicants' own disclosure as a blueprint to reconstruct the claimed invention from the prior art. See Interconnect Planning Corp. v. Feil, 227 USPQ 543 (Fed. Cir. 1985); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Gorman, 18 USPQ 2d 1885, 1888 (Fed. Cir. 1991); Al-Site Corp. v. VSI International, Inc., 50 USPQ2d 1161, 1171 (Fed. Cir. 1999).

A patentable invention may arise from a combination of elements found in the prior art. It is therefore not sufficient for the Examiner merely to identify individual components of an invention in multiple references. E.g., Ruiz v. A.B. Chance Co., 57 USPQ2d 1161, 1167 (Fed. Cir. 2000). The Examiner must demonstrate that a skilled artisan, with no knowledge of Applicants' claimed invention, would have selected the components for combination in the manner claimed. In re Kotzab, 55 USPQ2d 1313, 1316-18 (Fed. Cir. 2000). It is not sufficient for the Examiner to assert that separate elements of the claimed invention exist in the prior art, or that the elements in different references *could* be combined, or that there is an apparent need for combination of the elements, or that elements may be substitutes for one another. Ruiz v. A.B. Chance Co., 57 USPQ2d at 1167. To establish a prima facie case of unpatentability, the Examiner must provide evidence showing a reason, suggestion or motivation to combine.

The Examiner has not met this burden as a matter of law. The Examiner asserted that a motivation for applying Serra and Arce elements to a Yen mask would have been to provide the print mask as a software driver for driving the print head such that the print mask can be used in a variety of printing engine types. The Examiner cited no evidence in support of this motivation, which is nothing more than a conclusory statement.

Claims 1-11

Apart from the issue of motivation, Applicant's claims cannot be rejected based upon the cited references if the cited references fail to disclose elements recited in Applicant's claims. If the cited references fail to disclose elements recited in Applicant's claims, then combining elements from the cited references will not result in Applicant's claimed invention. As will be shown below, the cited references fail to disclose many elements recited in Applicant's claims.

In many cases, the Examiner seems to have simply overlooked some of the elements recited in the claims.

Independent claim 1 recites a mask for a laser thermal printer, the mask comprising a first set of first logical values, a second set of first logical values, and a set of second logical values. Independent claim 1 further recites that the first set of first logical values is spatially clustered in a first triangle-like shape and the second set of first logical values is spatially clustered in a second triangle-like shape.

Yen does not disclose a mask for a laser thermal printer as recited in claims 1-11. In fact, Yen does not mention a laser in any context. Yen is limited to inkjet printers, and inkjet printing and laser thermal printing involve disparate technical concerns. Yen describes how banding occurs with inkjet printers:

> The cause of the banding phenomenon is thought to be a combination of many contributing factors that result in an inaccuracy in the positioning of one particular nozzle of the black ("K") pen. For example, print head related errors, such as differences in nozzle directionalities; and paper related errors, such as those introduced by printing from a planar print head nozzle array to a curved recording medium, and by sine/cosine deviations of the printer paper gear mechanism from a perfect circle are all thought to contribute to the banding problem.
>
> In some instances, the banding problem may be attributed to particular print head nozzles. For example, among all the nozzles operating in a black print head having 96 nozzles, the 48th nozzle may be positioned a little too low, i.e. too close to the 49th nozzle. As shown in FIG. 3, under a video microscope with 60× magnification, a narrow faint white line followed by a dark band (e.g. bands 31-33) is clearly visible. As can be seen in the figure, not enough ink is deposited by the print head above the 48th nozzle line, while an overlap between the 48th and 49th nozzles shows that too much ink is deposited by the print head below the 48th nozzle line.

Yen, col. 1, line 66 to col. 2, line 19. Yen also describes a problem of "ink migration" that affects inkjet printing (col. 3, lines 1-23), and asserts that the Yen masks address the problem of ink migration as well (col. 3, lines 25-26).

There is nothing in Yen that suggests that laser thermal printing suffers from inaccuracy in the positioning of a nozzle, or differences in nozzle directionalities, or by printing to a curved surface, or overlapping printing of adjacent nozzles. There is nothing in Yen that suggests that ink migration occurs during laser thermal printing. There is nothing in Yen suggesting that causes of artifacts in inkjet printing apply to laser thermal printing.

In fact, laser thermal printing does not use nozzles at all, because, unlike inkjet printing, laser thermal printing does not shoot ink at a medium. Also, as described in Applicant's application, laser thermal printing involves consideration of heat produced by a laser, and the effect of heat generated by one laser upon neighbor lasers. According to Yen, such thermal considerations are not present in inkjet printing. Yen mentions nothing about one printing element affecting a neighboring printing element. Yen does not suggest that, in inkjet printing, the operation of one nozzle may in some way affect the operation of a neighboring nozzle, thermally or otherwise. Accordingly, the teachings of Yen relative to nozzle directionality and positioning are simply irrelevant to laser thermal printing issues addressed by the claims.

Serra likewise is directed to inkjet printing, and does not mention laser thermal printing at all. Like Yen, Serra is directed to addressing technical concerns that affect inkjet printing, such as pen patterns and nozzle spacing. In particular, Serra is concerned with "good liquid management" (col. 19, line 21) associated with ink migration problems (e.g., col. 19, lines 37-39). Instead of having neighboring printing elements beneficially affecting one another, Serra describes neighboring printing elements as adversely affecting one another, and prefers not to have neighboring printing elements (e.g., col. 19, lines 23-36). Serra mentions nothing about concerns pertaining to laser thermal printing, and in fact, the "good liquid management" concerns in Serra are not pertinent to laser thermal printing, which involves no liquid deposition.

There is no evidence in the record that an inkjet printing mask would address the same concerns as a thermal printing mask. Nor is there any evidence that applying a mask used in inkjet printing would have any benefit to thermal printing. Consequently, one skilled in the art of laser thermal printing would not look to Yen or Serra for masking techniques, nor would one skilled in the art be motivated to apply Yen and Serra techniques to a laser thermal printer.

Arce mentions green-noise masks that can be used with laser printers and thermal printers. Arce does not mention laser thermal printers. Not all laser printers are laser thermal printers, and not all thermal printers are laser thermal printers. Moreover, the techniques described in Arce are inconsistent with laser thermal printers, as the Arce techniques treat neighboring printing elements as adversely affecting one another.

Assuming for the sake of argument that Arce does disclose a masking technique applicable to laser thermal printers, the masks disclosed in Arce are significantly different from the mask recited in claims 1-11, because the green-noise mask array in Arce does not comprise a

first and second set of logical values as recited in claims 1-11. Rather, the masks described in Arce are described as having frequency characteristics or frequency modulating characteristics. In particular, the green-noise masks disclosed in Arce use predominantly mid-frequency components of white noise, as opposed to blue-noise masks, which use predominantly high-frequency components of white noise (col. 1, lines 59-61; col. 2, line 66 to col. 3, line 4; col. 7, lines 13-15).

Neither does Yen disclose a first set of first logical values, a second set of first logical values, and a set of second logical values set of logical values, as recited in claims 1-11. Yen makes no reference to logical values in general, or to logical '1' values in particular. Yen does not describe any digital processing that takes place during inkjet printing. Rather, Yen defines "masking" as a "process of producing the ink discharge pattern" (col. 1, lines 39-40) and refers to a mask as a "pattern" of "black dots" or "open dots" (col. 2, line 45, col. 3, line 36, col. 4, lines 60-61, 66-67) in a "matrix" (col. 5, line 1), that "turns off" (col. 3, line 29) or "muffle[s]" printing nozzles (e.g., col. 4, line 61). The mask is "implemented in the control signals applied to the print head" (col. 5, lines 33-34).

Nothing in Yen, however, suggests that the control signals are logical values as recited in claims 1-11. Nowhere does Yen describe a mask as a set of logical values, as recited in claims 1-11. The Examiner conceded that Yen fails to suggest that the control signals are logical values, but the Examiner asserted that Yen does indicate that the print masks can be implemented as a hardware or software driver to drive the print head.

Even if a Yen printing method could be adapted to use the ones and zeroes in a pixel grid as mentioned in Serra, the technique would still be directed to inkjet printing. Moreover, the technique would be incompatible with the frequency-based green-noise masks disclosed in Arce. Accordingly, adding Serra and Arce features to the Yen techniques would not result in the Applicant's invention as recited in claims 1-11.

Furthermore, the cited references do not support the Examiner's rejection of claims that depend on independent claim 1. None of the cited references discloses spatial proximity of sets of logical values, as recited in claims 3 and 4. None of the cited references discloses spatial proximity with respect to the spatial frequency of neighboring halftone dots, as recited in claim 4. None of the cited references discloses a mask extending in a first direction and a second direction, wherein the first and second triangle-like shapes include a base and a peak, wherein the

bases of the triangle-like shapes are oriented in the first direction, and wherein the base of the first triangle-like shape is spatially proximate to the peak of the second triangle-like shape in the second direction, as recited in claims 5 and 6. None of the cited references discloses spatial clustering of the set of second logical values in a third triangle-like shape, as recited in claims 7 and 8. None of the cited references discloses triangle-like shapes that are inverted with respect to one another, as recited in claim 8. None of the cited references discloses an irregular zigzag boundary as recited in claim 9. None of the cited references discloses a triangle-like shape that is a semicircular shape, a sinusoidal shape, a trapezoidal shape or a pentagonal shape, as recited in claim 10.

In connection with some of the elements recited in claims 1-11, the Examiner refers to FIG. 6 of Yen. Contrary to the Examiner's bare assertions, FIG. 6 does not disclose anything pertaining to halftone pixels, or an absence of alignment of peaks, or an irregular zigzag. In fact, FIG. 6 merely shows patterns of black and open circles, with the patterns of circles nicely aligned and nothing irregular at all. On the contrary, the Yen masking patterns are highly regular. Because Yen discloses regular masking patterns, one skilled in the art would not look to Yen for a solution to the problem of artifacts introduced by regular printing patterns. In particular, one skilled in the art who is interested in breaking up printing patterns would not look to Yen, which describes using a highly regular pattern.

Claims 12-15

Independent claim 12 recites a mask for a laser thermal printer, comprising a first subset mask and a second subset mask. Each subset mask comprises a first set of first logical values, a second set of first logical values, and a set of second logical values. In addition, the first set of first logical values in the first subset mask is spatially clustered in a first triangle-like shape and the second set of first logical values in the first subset mask is spatially clustered in a second triangle-like shape.

Many of the arguments made above with respect to claims 1-11 are applicable to claims 12-15 as well, and Applicant incorporates those arguments here as well. In addition, none of the cited references disclose subset masks as recited in claims 12-15. None of the cited references disclose two subset masks, each mask having characteristics recited in independent claim 12. In addition, the cited references do not support the Examiner's rejection of claims that depend on

independent claim 12. Even if one skilled in the art were motivated to apply Serra or Arce techniques with a Yen system, Applicant's invention would not result.

Claims 16-18

Independent claim 16 recites a mask for a laser thermal printer, the mask comprising a first subset mask and a second subset mask, each subset mask comprising at least one set of first logical values and at least one set of second logical values, wherein the set of first logical values in the first subset mask has a first triangle-like shape and wherein the set of first logical values in the second subset mask has a second triangle-like shape.

Applicant incorporates the arguments made above with respect to claims 1-11 and 12-15. The cited references do not disclose subset masks at all, and do not disclose different triangle-like shapes for the subset masks, as recited in independent claim 16. Furthermore, the cited references do not support the Examiner's rejection of claims that depend on independent claim 16. Even if one skilled in the art were somehow motivated to apply Serra or Arce techniques with a Yen system, Applicant's invention would not result.

Claims 19-22

Independent claim 19 recites a method for printing with a laser thermal printing system. The method includes printing a swath on a thermally sensitive medium as a function of a set of data, and varying the breadth of the swath during printing.

Applicant once again incorporates arguments made above. As already pointed out, Yen and Serra pertain exclusively to inkjet printing, not laser thermal printing. Yen and Serra do not disclose printing with a laser thermal printing system, nor do Yen and Serra disclose printing a swath on a thermally sensitive medium, as recited in independent claim 19. Nor do Yen and Serra disclose varying the breadth of the swath during printing, as recited in independent claim 19. Assuming for the sake of argument that Arce disclose a masking technique applicable to laser thermal printers, Arce does not disclose printing a swath of varying breadth.

Further, none of the references discloses varying a breadth of a swath by contracting the breadth of the swath and expanding the breadth of the swath, as recited in claim 20, or by irregularly contracting the breadth of the swath and irregularly expanding the breadth of the swath, as recited in claim 21, or by varying the breadth of the swath as a function of the set of

data and a mask, as recited in claim 22. Once again, even if one skilled in the art were motivated to apply Serra or Arce techniques with a Yen system, Applicant's invention would not result.

Claims 23-26

Independent claim 23 recites a method comprising generating a first set of first logical values in a first triangle-like shape, generating a second set of first logical values in a second triangle-like shape, and generating a mask for a laser thermal printer comprising a set of second logical values, the first set of first logical values in the first triangle-like shape and the second set of first logical values in the second triangle-like shape.

Applicant again incorporates arguments made above. The cited references do not disclose generating sets of logical values, as recited in independent claim 23. Nor do the cited references disclose generating sets of logical values into any triangle-like shape, as recited in independent claim 23. Nor do the cited references disclose generating sets of logical values into first and second triangle-like shapes, as recited in independent claim 23.

The cited references do not support the Examiner's rejection of claims that depend on independent claim 23. The cited references do not disclose defining a first column comprising a second subset of contiguous first logical values, as recited in claim 24. Claim 24 further recites that the second subset of contiguous first logical values is a function of the first subset, a trend direction and a spatial frequency. The cited references disclose none of these elements. The cited references also fail to disclose the second subset of contiguous first logical values being further a function of a random element, as recited in claim 25.

Claims 27-30

Independent claim 27 recites a method comprising generating a first subset mask comprising a first set of first logical values and a first set of second logical values, generating a second subset mask comprising a second set of first logical values and a second set of second logical values, and assembling a mask for a laser thermal printer from the first subset mask and the second subset mask.

Applicant once again incorporates arguments made above. The cited references do not disclose generating a first subset mask and a second subset mask, or of assembling a mask from the first and second subset masks, as recited in independent claim 27.

The cited references do not support the Examiner's rejection of claims that depend on independent claim 27. The cited references do not disclose spatial clustering of logical values, as recited in claim 28, or evaluating the first subset mask to determine whether printing on a laser thermal printing system as a function of the set of data and the first subset mask will create a pattern in a printed image, as recited in claim 29.

Claims 31-34

Independent claim 31 is directed to a system. The claimed system includes a thermally sensitive color donor including colorant, a receptor positioned to receive colorant from the donor, a controller, and a set of lasers, each of the lasers receiving a signal from the controller and emitting a beam directed at the donor as a function of the signal, the beams forming a swath having a breadth. Claim 31 further recites that the controller varies the breadth of the swath during printing.

Although claims 31-34 are directed to a system, Applicant's previous arguments pertaining to methods are pertinent and are once again incorporated herein. Independent claim 31 recites structures that pertain to laser thermal printing. Independent claim 31 recites a thermally sensitive color donor with colorant and a receptor positioned to receive colorant from the donor. Yen and Serra, which pertain to inkjet printing, do not disclose these elements at all. Arce says nothing about a thermally sensitive color donor with colorant or a receptor positioned to receive colorant from the donor. The cited references do not disclose these elements recited in independent claim 31. Independent claim 31 further recites a set of lasers. None of the cited references makes the slightest mention of any such element.

In addition, independent claim 31 recites a controller that varies the breadth of the swath during printing. As noted above, the cited references disclose no element that varies the breadth of a swath during printing. Nor do the cited references disclose irregularly contracting and irregularly expanding the breadth of the swath, as recited in claim 34.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any

additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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